Homeland Security: Protecting our Drinking Water

Delaware Valley Early Warning Partnership Includes the DRBC

The Delaware and Schuylkill rivers provide drinking water for over three million people in the Philadelphia, Pa. - Camden, N.J. metropolitan area. Potential threats to these water supplies include a wide variety of accidental and intentional chemical, biological, and radiological releases that could result from industrial, maritime shipping, or waste treatment accidents and terrorist attacks. Terrorism could take the form of direct introduction of contaminants, or a more likely scenario of an attack on industrial infrastructure resulting in a release.

The DRBC and its partners are working on three tools to protect against accidental and intentional threats to these important drinking water sources: an Early Warning System (EWS), an advanced flow and transport model, and a real-time prototype detector network.

"A comprehensive contaminant transport model administered by DRBC working in conjunction with the Delaware Valley EWS and real-time water quality monitoring will provide unparalleled regional coordination, communication and response to water quality contamination events in the Delaware River Basin."

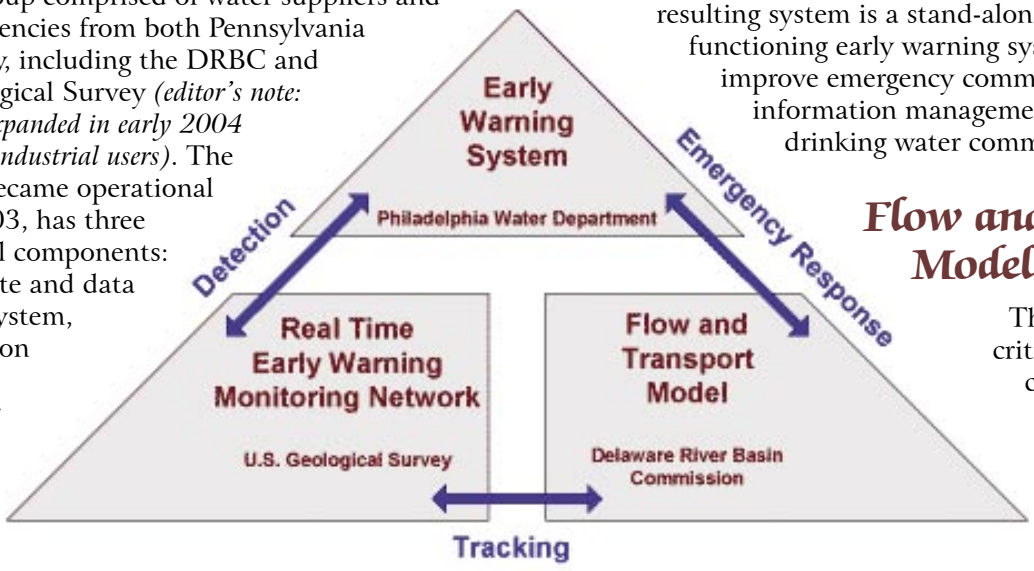
– Philadelphia Water Department

Early Warning System (EWS)

The Philadelphia Water Department (PWD) developed the Delaware Valley EWS with a $725,000 grant awarded by the Pennsylvania Department of Environmental Protection in the aftermath of September 11, 2001. It was crafted with the cooperation and support of the EWS Partnership, which is a stakeholder group comprised of water suppliers and government agencies from both Pennsylvania and New Jersey, including the DRBC and the U.S. Geological Survey *(editor's note: this group was expanded in early 2004 to include select industrial users)*. The EWS, which became operational in October 2003, has three major technical components: a secure web-site and data management system, a communication system, and a real-time water quality monitoring network.

The overriding goal of the grant and the resulting project was to protect the drinking water supply infrastructure, which was identified as being among the nation's high priority resources vulnerable to a potential terrorist attack. In addition to serving this purpose, the EWS offers advance warning of accidental source water contamination events resulting from spills, transportation accidents, fires and other similar incidents. The EWS also provides water suppliers with source water quality information valuable in the daily operation of a water treatment plant.

PWD had one year to design and build the Delaware Valley EWS, and in that time focused on developing a system that would provide a framework to be expanded upon and enhanced in the future. The resulting system is a stand-alone and fully functioning early warning system that will improve emergency communication and information management among the drinking water community.



Delaware River Drinking Water Source Protection

The Delaware River Basin Commission, the City of Philadelphia, and the U.S. Geological Survey are working in concert to implement source water protection in the tidal Delaware River and tributaries.

Flow and Transport Model

The second critical tool under consideration is an advanced flow and transport model. The DRBC and its

partners recognize that fast and accurate simulations showing the movement of contaminants in tidal waters are a critical component of emergency response efforts in the Delaware Valley. The Delaware River is unusual because it has over 50 miles of tidal fresh water that supports numerous water intakes for Philadelphia and other Delaware Valley communities. When a contaminant is released to the tidal Delaware River below Trenton, N.J., the amount of time that contaminant remains in the water and the number of intakes it impacts are ultimately determined by the tidal fluctuation and flows from tributaries, including the non-tidal Delaware River above Trenton. Tidal movement of water in the Delaware exceeds 12 miles in many locations. A contaminant released at a given location can easily impact both upstream and downstream intakes. During a contaminant release event, water utility managers need to know which public water intakes will be impacted and for how long in order to determine how to use limited water reserves most efficiently.

By refining and linking tools developed for other purposes, the DRBC is in a unique position to develop a highly accurate real time model for contaminant transport. This capability is enhanced by the DRBC's unique position in the basin, including its ability to work across political boundaries, a wealth of water management data and understanding, and existing relationships with water utility managers.

"The Commission's role in ensuring a safe and plentiful water supply, including coordination of emergency preparedness plans among the federal government and the four basin states, is of growing importance today, given the number of natural and manmade threats that can impact this regional water resource."

– Ruth Ann Minner
Delaware Governor

Real Time Early Warning Monitoring Network

Finally, DRBC is working with the U.S. Geological Survey (USGS) to secure additional funding to support development of real time detectors of chemical, biological, and radiological agents in drinking water sources as well as in water distribution systems. Through this ongoing effort, USGS will develop the monitoring infrastructure needed to support prototype detectors, test and compare new detectors as they become available, and provide water supply managers with real-time data.

Next Steps

Although PWD will continue to operate the current Early Warning System, the EWS Partnership is seeking U.S. Department of Homeland Security grant funds through New Jersey and Pennsylvania for important enhancements that will make EWS even more powerful and effective. These funds would allow the system to encompass a wider geographic area, improve its database, web server, and communication systems, develop an enhanced flow and transport model to be undertaken by the DRBC, and enhance real-time monitoring capability. The projected total cost for these improvements is about $1.1 million, which includes operating costs for seven real-time monitoring platforms during the first year. Additional funds of $945,000 would be required to continue the real-time monitoring operations for three more years. Efforts to develop dedicated funding sources for real-time monitoring from public and private entities and to expand the EWS Partnership would then be undertaken over the next four years.